

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-311689  
(43)Date of publication of application : 26.11.1996

(51)Int.Cl.

C25D 7/12  
C25D 17/08  
H01L 21/288  
H01L 21/68

(21)Application number : 07-121467

(71)Applicant : ELECTROPLATING ENG OF JAPAN CO

(22)Date of filing : 19.05.1995

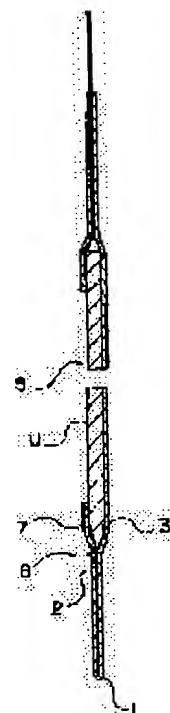
(72)Inventor : SAKAKI YASUHIKO

## (54) WAFER PLATING METHOD AND SEALING BODY USED THEREFOR

(57)Abstract:

PURPOSE: To further miniaturize a device in the immersion plating of a wafer and to make up for the defect of the immersion plating that the nonuniformity tends to cause when a plating soln. is circulated.

CONSTITUTION: A wafer U is held between the front covering material 2 and rear covering material 3 using plastic film, etc., the front covering material is firmly attached to the wafer surface around a plating opening 5, the front covering material is firmly attached to the rear covering material on the circumference of the wafer, hence the rear of the wafer is protected from a plating soln., and the wafer is plated. Consequently, the wafer protective structure against the plating soln. is remarkably thinned, the device is miniaturized, and the uniformity of plating is enhanced.



## LEGAL STATUS

[Date of request for examination] 20.02.1997

[Date of sending the examiner's decision of rejection] 12.01.1999

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

DERWENT-ACC-NO: 1997-062280

DERWENT-WEEK: 199706

COPYRIGHT 1999 DERWENT INFORMATION LTD

TITLE: Plating wafer - by holding wafer  
between surface covering part and back surface  
covering part

PATENT-ASSIGNEE: NIPPON ELECTROPLATING ENGINEERS KK[NIELN]

PRIORITY-DATA: 1995JP-0121467 (May 19, 1995)

PATENT-FAMILY:

PUB-NO	PAGES	PUB-DATE	
LANGUAGE		MAIN-IPC	
JP 08311689 A		November 26, 1996	N/A
006	C25D 007/12		

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO
APPL-DATE		
JP 08311689A	N/A	
1995JP-0121467	May 19, 1995	

INT-CL (IPC): C25D007/12, C25D017/08 , H01L021/288 ,  
H01L021/68

ABSTRACTED-PUB-NO: JP 08311689A

BASIC-ABSTRACT:

To conduct plating for a wafer, the wafer (U) is held  
between the surface  
covering part (2) and the back surface covering part. (3).  
Tight contact is  
confirmed against circumference of an opening of the  
surface covering member  
(2).

ADVANTAGE - Miniaturisation of plating appts..

CHOSEN-DRAWING: Dwg.2/5

TITLE-TERMS: PLATE WAFER HOLD WAFER SURFACE COVER PART BACK

SURFACE COVER PART

DERWENT-CLASS: L03 M11 U11

CPI-CODES: L04-C10; M11-B05; M11-C;

EPI-CODES: U11-C05C6;

SECONDARY-ACC-NO:

CPI Secondary Accession Numbers: C1997-020568

Non-CPI Secondary Accession Numbers: N1997-051401

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to the technology of the plating processing performed to a wafer as a part of processing processing of a semiconductor.

[0002]

[Description of the Prior Art] In galvanizing to a wafer, in order to avoid that a plating metal generally adheres to the rear face, plating processing is performed where a rear face is protected from plating liquid. a fixture which is indicated by the "cup formula" using a plating tub, and JP,5-218048,A and JP,6-310461,A of cup type which is indicated by JP,2-38472,U and JP,5-320978,A, for example about plating processing of such a wafer -- the "immersing formula" which soaks the wafer which protected the rear face in a plating tub, and galvanizes it with a seal means [ like ] is known conventionally

[0003] Although these "a cup formula" and the "immersing formula" are properly used according to various conditions, they are because it has merits and demerits in each. Namely, since this is performed about processing of a wafer in a clean room Although to miniaturize equipment as much as possible is desired in order to desire to raise the ratio of automation in order to lessen the number of the operators in a clean room as much as possible, and to make small occupancy area of the high clean room of space cost Although a "cup formula" has the advantage in which automation of a process is easy, about this There is demerit in which enlargement of equipment is unavoidable since it is necessary to put superficially two or more cups with opening corresponding to the size of a wafer in order. on the other hand, an "immersing formula" Since the wafer which carried out the seal can be stood and processed in a plating tub with a seal means, although there is the advantage in which equipment is comparatively small and ends, there is demerit in which the work which attaches a seal means in a wafer is complicated, and automation of a process is difficult.

[0004] Moreover, where a seal means is attached in a wafer, the structure element of a seal means will project at an "immersing ceremony" from the front face of a wafer, and there is also demerit in which this lobe tends to become the homogeneous prevention factor of plating in it. That is, since the wafer which attached the seal means by the "immersing formula" will be stood, placed, carried out and processed in a plating tub, in order to raise current density and to plating speed up, when giving a liquid flow to plating liquid, a liquid flow will be formed in the vertical direction. For this reason, the lobe from a wafer front face tends to give a dead angle to a liquid flow, and it is easy to invite heterogeneity to plating from the reasons of the behavior of a liquid flow becoming very complicated by this lobe.

[0005]

[Problem(s) to be Solved by the Invention] this invention was made against the background of such a situation, and while being able to develop the advantage further, when [ of the "immersing formula" that equipment is comparatively small and ends ] giving a liquid flow to plating liquid, it aims at offer of the plating technology of the "immersing formula" of being easy to cause the heterogeneity of plating in which demerit is improvable.

[0006]

[Means for Solving the Problem] For such a purpose, by this invention about the plating method of galvanizing to a wafer where a rear face is protected from plating liquid The surface coating material in which it was formed in using the material which can be stuck on the surface of the wafer fluid-tight, and opening for plating was prepared while it was thin and was supple, Fluid-tight at the rear face of this surface coating material and a wafer, while inserting a wafer between the rear-face covering material which can be stuck and sticking surface coating material fluid-tight on the surface of a wafer about the circumference of opening for plating in this state Protection from the plating liquid of the rear face of a wafer is given by sticking mutually surface coating material and rear-face covering material fluid-tight about the circumference of a wafer, and it is made to galvanize to a wafer. [0007] according to the plating method of such this invention, it is a wrap about a wafer in the surface coating material and rear-face covering material of thickness of necessary minimum [ give / the protection nature which can fully secure mutual adhesion and protects a wafer from plating liquid ] -- coming out -- ending -- the thickness of such covering material -- general -- several 10- about hundreds of microns are sufficient That is, the thickness of the protective construction to the plating liquid given to the wafer can be substantially managed with the almost same grade as the thickness of the wafer itself. consequently, compared with the protective construction by the seal means in the conventional "immersing formula", it can be markedly alike, and can become thin, the interval which puts a wafer in order within a plating tub can be narrowed sharply, and the advantage of the "immersing formula" that equipment is comparatively small and ends can be developed further [0008] Moreover, according to the plating method of this invention, the surface coating material of the thickness of dozens - about

100 microns of numbers only hangs on the surface of a wafer as mentioned above. Therefore, the projection element in the wafer front face leading to [ of plating / homogeneous ] prevention can be lost substantially, and in order to process with high current density, even when giving a liquid flow to plating liquid, homogeneous high plating can be performed.

[0009] Since it is made to stick thin covering material furthermore according to the plating method of this invention, the electrode using thin electric conduction material can be efficiently contacted to a wafer. For this reason, the thin conductor made into the ring configuration [ \*\*\*\* / the periphery configuration of a wafer ] along with opening for plating of surface coating material can be allotted, and a cathode electrode can be formed by contacting this conductor to a wafer on the whole or partially at the time of adhesion on the wafer front face of surface coating material. And by doing in this way, the contact to the wafer of a cathode electrode can be freely set up by the various methods from contact in the latus area covering the perimeter of a wafer to contact by two or more punctiform contact, for example, the homogeneity of the plating in the plating by the comparatively bad metal of throwing power can also be raised like a pewter.

[0010] It is desirable to form each covering material of a front face and a rear face by plastics material from points, such as resistance over that it is easy to give mutual adhesion by the above plating methods by this invention and plating liquid.

[0011] Moreover, although the adhesion which uses adhesives and a binder for fluid-tight adhesion on the wafer front face of surface coating material or fluid-tight adhesion of both covering material is also possible, it is desirable to make it stick by heat welding from points, such as processability. As for the front-face side which contacts plating liquid in each covering material of a front face and a rear face while giving the plastics material of heat welding nature to each adhesion side, in using adhesion by heat welding, it is desirable to form by the multilayer structure made into the high plastics material of plating-proof fluidity.

[0012] The seal object used for the plating method by the above this inventions becomes the rear face of the surface coating material in which it was formed in using the material which can be stuck on the surface of the wafer fluid-tight, and opening for plating was prepared while it was thin and was supple, this surface coating material, and a wafer from the rear-face covering material which can be stuck fluid-tight, and is used for it as mentioned above.

[0013] About this seal object, since it is above, it is desirable to form each covering material of a front face and a rear face by plastics material. Moreover, surface coating material and rear-face covering material are formed by the multilayer structure which gave the plastics material of heat welding nature to each adhesion side. It is desirable to stick adhesion on the front face of the wafer of surface coating material and both covering material by heat welding. It is still more desirable when a cathode electrode is formed by allotting a thin conductor along with opening for plating of surface coating material furthermore, and contacting this conductor to a wafer at the time of adhesion on the wafer front face of surface coating material.

[0014]

[Example] Hereafter, one example of this invention is explained. The seal object first used by this example is explained. As shown in drawing 3, it bends and the seal object 1 is formed in middle so that a high heat welding nature side may become inside about what prepared the plastics material whose whole thickness is about 50micro in the long and slender rectangle with the two-layer structure to which the laminating of the high plastic film of heat welding nature and the high plastic film of plating-proof fluidity was carried out. And the side of one of these is made into the surface coating material 2, and let the another side side be rear-face covering material 3. The notches 4a-4d for the support receptacle sections are formed in each corner at each covering material 2 and 3 of this front face and a rear face.

[0015] Moreover, the opening 5 for plating with an inner circumference configuration [ \*\*\*\* / the periphery configuration of a wafer ] is formed in the surface coating material 2. Let this opening 5 for plating be the size from which the surface coating material 2 covers the periphery marginal part of Wafer U by width of face of about 3mm by the state where Wafer U was made to hold as drawing 1 and drawing 2 saw. Furthermore, the conductor 6 for cathode electrodes is formed in the surface coating material 2 along with the opening 5 for plating. This conductor 6 was formed with the copper plate with a thickness of about dozens of micro, was made into the structure which is a ring [ \*\*\*\* / the periphery configuration of Wafer U / on the whole ], and protruded two or more contact 7 and 7 at a fixed interval, and .... on the inside, and is beforehand pasted up on the surface coating material 2.

[0016] In order to attach this seal object 1 in Wafer U in the state where drawing 1 and drawing 2 see, Wafer U is inserted between the surface coating material 2 and rear-face covering material 3, between heating rollers is passed, or a hotpress is hung, and heating and pressurization are performed. And by this heating and pressurization, the surface coating material 2 carries out heat welding on the front face of Wafer U about the circumference of the opening 5 for plating, and, on the whole, heat welding of the surface coating material 2 and the rear-face covering material 3 \*\* is mutually carried out about the margin portion around Wafer U. Consequently, anchoring in the state of drawing which protected the rear face of Wafer U fluid-tight to plating liquid is made. Moreover, the notches 4a-4d which contact 7 and 7 of a conductor 6 and .... contact the periphery section of Wafer U, and cathode contact is obtained, and serve as a pair in this state are put together, and form the support receptacle sections 8a-8d.

[0017] Next, the plating equipment used by this example is explained. As shown in drawing 4 and drawing 5, plating equipment 10 has structure which was made to perform the temperature control of the plating liquid 14 in a plating tub with the heat-source liquid 13 which surrounded the circumference of the plating tub 11 by the periphery tub 12, and was made to store among both tubs, and the base material 15 for making two or more seal objects support simultaneously is formed into the plating tub 11, and the aeration pipe 16 is formed in the pars basilaris ossis occipitalis of the plating tub 11.

[0018] four bearing bars 17 and 17 and .... which made the base material 15 parallel mutually, and were prepared -- having -- \*\*\*\* -- each support receptacle sections 8a-8d of correspondence in each of this bearing bar 17 -- inserting in -- doubling -- each support receptacle section 8 -- the seal object 1 is supported by pinching and fixing with the fixed rings 18 and 18 of a couple from both sides every a-8d Moreover, it connects with the rotation drive 19 and is made for the base material 15 to have rotational

tion performed right and left by turns by the fixed time basis.

[0019] In order to galvanize using above plating equipment 10 to the wafer U made to hold on the above seal objects 1, while making a base material 15 support the seal object 1 of the predetermined number which holds a wafer, respectively as mentioned above, the anode electrode board A is made to support between the seal objects 1, and predetermined-time plating is performed, carrying out rotational motion of this base material 15 to right and left by turns by the time basis fixed as mentioned above. It meets in parallel with the seal object 1, and the liquid flow of the suitable rate of flow is made to form by supplying a suitable quantity of a gas from the aeration pipe 16 in the meantime.

[0020] If the plating of a predetermined time ends, after taking out the seal object 1 from the plating tub 11 and passing through a predetermined washing process, a cutter knife etc. is used, the seal object 1 is torn apart, and Wafer U is taken out.

[0021]

[Effect of the Invention] since according to this invention the thickness of the seal structure over a wafer can be boiled markedly and can be made thin as explained above, it becomes possible to process many wafers by the small plating tub, and the advantage of the "immersing formula" that equipment is comparatively small and ends can be developed further Moreover, even when giving a liquid flow to plating liquid in order to process with high current density since the protrusion element on the front face of a wafer at the time of carrying out a seal can be lost, homogeneous high plating can be performed, and when giving a liquid flow to plating liquid, the demerit of the "immersing formula" of being easy to cause the heterogeneity of plating can be improved.

---

[Translation done.]

Japan Patent Office is not responsible for any  
damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## CLAIMS

---

### [Claim(s)]

- [Claim 1] In the plating method of galvanizing to a wafer where a rear face is protected from plating liquid The surface coating material in which it was formed in using the material which can be stuck on the surface of the wafer fluid-tight, and opening for plating was prepared while it was thin and was supple, Fluid-tight at the rear face of this surface coating material and a wafer, while inserting a wafer between the rear-face covering material which can be stuck and sticking surface coating material fluid-tight on the surface of a wafer about the circumference of opening for plating in this state The plating method characterized by giving protection from the plating liquid of the rear face of a wafer by sticking mutually surface coating material and rear-face covering material fluid-tight about the circumference of a wafer, and galvanizing to a wafer.
- [Claim 2] The plating method according to claim 1 which used the surface coating material formed by plastics material, respectively, and rear-face covering material.
- [Claim 3] The plating method according to claim 1 or 2 to which made it make adhesion on the front face of the wafer of surface coating material, and adhesion of both covering material carry out by heat welding using the surface coating material and rear-face covering material which gave the plastics material of heat welding nature to each adhesion side, and were formed in multilayer structure.
- [Claim 4] The plating method given in any 1 term of the claim 1 which formed the cathode electrode by allotting a thin conductor along with opening for plating of surface coating material, and contacting this conductor to a wafer at the time of adhesion on the wafer front face of surface coating material - a claim 3.
- [Claim 5] The seal object which becomes the rear face of the surface coating material in which it was the seal object used for the plating method according to claim 1, and it was formed in using the material which can be stuck on the surface of the wafer fluid-tight, and opening for plating was prepared while it was thin and was supple, this surface coating material, and a wafer from the rear-face covering material which can be stuck fluid-tight.
- [Claim 6] The seal object according to claim 5 which formed surface coating material and rear-face covering material by plastics material.
- [Claim 7] The seal object according to claim 5 or 6 which forms surface coating material and rear-face covering material by the multilayer structure which gave the plastics material of heat welding nature to each adhesion side, and stuck adhesion on the front face of the wafer of surface coating material, and both covering material by heat welding.
- [Claim 8] A seal object given in any 1 term of the claim 5 which formed the cathode electrode by allotting a thin conductor along with opening for plating of surface coating material, and contacting this conductor to a wafer at the time of adhesion on the wafer front face of surface coating material - a claim 7.

---

[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平8-311689

(43) 公開日 平成8年(1996)11月26日

(51) Int.Cl. <sup>5</sup>	識別記号	庁内整理番号	F I	技術表示箇所
C 2 5 D 7/12			C 2 5 D 7/12	
			17/08	Q
H 0 1 L 21/288			H 0 1 L 21/288	E
21/68			21/68	N

審査請求 未請求 請求項の数8 O L (全 6 頁)

(21) 出願番号 特願平7-121467

(22) 出願日 平成7年(1995)5月19日

(71) 出願人 000228165

日本エレクトロプレイティング・エンジニアーズ株式会社

東京都中央区日本橋茅場町2丁目6番6号

(72) 発明者 榊 泰彦

神奈川県平塚市代官町20-6代官町ハウゼック202

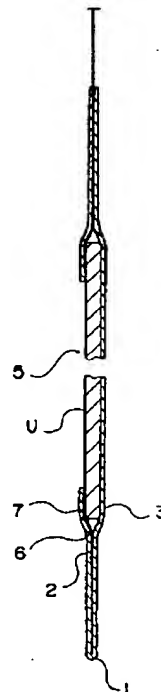
(74) 代理人 弁理士 高月 猛

(54) 【発明の名称】 ウェーハのめっき方法及びそれに用いるシール体

(57) 【要約】、

【目的】ウェーハの浸漬式めっきについて、装置のより一層の小型化を可能とし、まためっき液に液流を与える場合にめっきの不均一性を招き易いという浸漬式の短所を改善する。

【構成】プラスチックフィルムなどを用いた表面被覆材2と裏面被覆材3の間にウェーハUを挟み、この状態でめっき用開口5の周囲について表面被覆材をウェーハの表面に密着させると共に、ウェーハの周囲について表面被覆材と裏面被覆材を互いに密着させることでウェーハの裏面をめっき液から保護してめっきを施すようにしている。このようにすることにより、ウェーハに与えるめっき液に対する保護構造の厚みを格段に薄くすることができ、この結果、装置の小型化を図れ、まためっきの均一性を高めることができる。





## 【特許請求の範囲】

【請求項1】 裏面をめっき液から保護した状態でウェーハにめっきを施すめっき方法において、薄くて柔軟性があると共にウェーハの表面に液密的に密着可能である材料を用いて形成され且つめっき用開口が設けられた表面被覆材と、この表面被覆材及びウェーハの裏面に液密的に密着可能な裏面被覆材との間にウェーハを挟み、この状態でめっき用開口の周囲について表面被覆材をウェーハの表面に液密的に密着させると共に、ウェーハの周囲について表面被覆材と裏面被覆材を互いに液密的に密着させることでウェーハの裏面のめっき液からの保護を与えてウェーハにめっきを施すようにしたことを特徴とするめっき方法。

【請求項2】 それぞれプラスチック材で形成した表面被覆材と裏面被覆材を用いるようにした請求項1に記載のめっき方法。

【請求項3】 それぞれの密着側面に熱溶着性のプラスチック材を施して多層構造に形成した表面被覆材と裏面被覆材を用い、表面被覆材のウェーハの表面への密着及び両被覆材同士の密着を熱溶着で行なわせるようにした請求項1又は請求項2に記載のめっき方法。

【請求項4】 表面被覆材のめっき用開口に沿って薄い導電体を配し、この導電体を表面被覆材のウェーハ表面への密着時にウェーハに接触させることでカソード電極を形成するようにした請求項1～請求項3の何れか1項に記載のめっき方法。

【請求項5】 請求項1に記載のめっき方法に用いるシール体であって、薄くて柔軟性があると共にウェーハの表面に液密的に密着可能である材料を用いて形成され且つめっき用開口が設けられた表面被覆材と、この表面被覆材及びウェーハの裏面に液密的に密着可能な裏面被覆材とからなるシール体。

【請求項6】 表面被覆材と裏面被覆材をプラスチック材で形成した請求項5に記載のシール体。

【請求項7】 表面被覆材及び裏面被覆材をそれぞれの密着側面に熱溶着性のプラスチック材を施した多層構造で形成し、表面被覆材のウェーハの表面への密着及び両被覆材同士の密着を熱溶着でなすようにした請求項5又は請求項6に記載のシール体。

【請求項8】 表面被覆材のめっき用開口に沿って薄い導電体を配し、この導電体を表面被覆材のウェーハ表面への密着時にウェーハに接触させることでカソード電極を形成するようにした請求項5～請求項7の何れか1項に記載のシール体。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、半導体の加工処理の一部としてウェーハに施すめっき処理の技術に関する。

【0002】

【従来の技術】ウェーハにめっきを施す場合には、一般

にその裏面にめっき金属が付着することを避けるために、裏面をめっき液から保護した状態でめっき処理を行なう。このようなウェーハのめっき処理については、例えば実開平2-38472号公報や特開平5-320978号公報に開示されるようなカップ形のめっき槽を用いる“カップ式”と、例えば特開平5-218048号公報や特開平6-310461号公報に開示されるような治具様のシール手段で裏面を保護したウェーハをめっき槽内に漬けてめっきする“浸漬式”が従来より知られている。

【0003】これら“カップ式”と“浸漬式”は、種々の条件に応じて使い分けられているが、それはそれぞれに一長一短があるからである。即ちウェーハの加工については、これがクリーンルームで行なわれるので、クリーンルーム内での作業者の数を出来るだけ少なくするために自動化の比率を高めることが望まれ、またスペースコストの高いクリーンルームの占有面積を小さくするために、出来るだけ装置を小型化することが望まれるが、これに関し、“カップ式”は、工程の自動化が容易であるという長所があるものの、ウェーハのサイズに対応する開口を持つカップを複数個平面的に並べる必要があるため装置の大型化を避けられないという短所があり、一方“浸漬式”は、シール手段でシールしたウェーハをめっき槽内に立て処理できるので装置が比較的小型で済むという長所があるものの、シール手段をウェーハに取り付ける作業が複雑で工程の自動化が困難であるという短所がある。

【0004】また“浸漬式”には、シール手段をウェーハに取り付けた状態でシール手段の構造要素がウェーハの表面から突出することになり、この突出部がめっきの均一性の阻害要因になり易いという短所もある。即ち“浸漬式”ではシール手段を取り付けたウェーハをめっき槽内に立て置きして処理することになるので、電流密度を高めてめっき速度を速めるためにめっき液に液流を与える場合、上下方向で液流を形成することになる。このためウェーハ表面からの突出部が液流に対し死角を与え易く、またこの突出部により液流の挙動が非常に複雑になるなどの理由から、めっきに不均一性を招き易い。

【0005】

【発明が解決しようとする課題】このような事情を背景になされたのが本発明で、装置が比較的小型で済むという“浸漬式”の長所をより一層伸ばすことができると共に、めっき液に液流を与える場合にめっきの不均一性を招き易いという“浸漬式”の短所を改善できるめっき技術の提供を目的としている。

【0006】

【課題を解決するための手段】このような目的のために、本発明では、裏面をめっき液から保護した状態でウェーハにめっきを施すめっき方法について、薄くて柔軟性があると共にウェーハの表面に液密的に密着可能であ

る材料を用いて形成され且つめっき用開口が設けられた表面被覆材と、この表面被覆材及びウェーハの裏面に液密的に密着可能な裏面被覆材との間にウェーハを挟み、この状態でめっき用開口の周囲について表面被覆材をウェーハの表面に液密的に密着させると共に、ウェーハの周囲について表面被覆材と裏面被覆材を互いに液密的に密着させることでウェーハの裏面のめっき液からの保護を与えてウェーハにめっきを施すようにしている。

【0007】このような本発明のめっき方法によると、互いの密着性を十分に確保でき、またウェーハをめっき液から保護する保護性を与えるのに必要最小限の厚みの表面被覆材と裏面被覆材でウェーハを覆うだけで済み、そのような被覆材の厚みは一般に数十〜数百ミクロン程度で足りる。つまりウェーハに与えためっき液に対する保護構造の厚みは、実質的にウェーハ自体の厚みとほとんど同じ程度で済む。この結果、従来の“浸漬式”におけるシール手段による保護構造に比べ格段に薄くなり、ウェーハをめっき槽内で並べる間隔を大幅に狭めることができ、装置が比較的小型で済むという“浸漬式”の長所をより一層伸ばすことができる。

【0008】また本発明のめっき方法によると、上記のように数十〜数百ミクロン程度の厚みの表面被覆材がウェーハの表面に被さるだけである。したがってめっきの均一性の阻害要因となるウェーハ表面における突出要素を実質的になくすることができ、高い電流密度で処理するためにめっき液に液流を与える場合でも均一性の高いめっきを施すことができる。

【0009】さらに本発明のめっき方法によると、薄い被覆材を密着させるようにしているので、薄い導電材を用いた電極をウェーハに対し効率的に接触させることができる。このため表面被覆材のめっき用開口に沿って例えばウェーハの外周形状と相似なリング形状とした薄い導電体を配し、この導電体を表面被覆材のウェーハ表面への密着時にウェーハに全体的にあるいは部分的に接触させることでカソード電極を形成することができる。そしてこのようにすることにより、カソード電極のウェーハへの接触をウェーハの全周にわたる広い面積での接触から複数の点状接触による接触までの多様な仕方でも自由に設定することができ、例えばハンダのように均一電着性の比較的悪い金属によるめっきにおけるめっきの均一性も高めることができる。

【0010】本発明による上記のようなめっき方法では、互いの密着性を与え易いこと、まためっき液に対する耐性などの点から表面及び裏面の各被覆材をプラスチック材で形成するのが好ましい。

【0011】また表面被覆材のウェーハ表面への液密的な密着や両被覆材同士の液密的な密着には例えば接着剤や粘着剤を用いる密着も可能であるが、加工性などの点から熱溶着で密着を行なわせるのが好ましい。熱溶着による密着を利用するについては、表面及び裏面の各被覆

材を、それぞれの密着側面に熱溶着性のプラスチック材を施す一方で、めっき液に接触する表面側は耐めっき液性の高いプラスチック材とする多層構造で形成するのが好ましい。

【0012】以上のような本発明によるめっき方法に用いるシール体は、薄くて柔軟性があると共にウェーハの表面に液密的に密着可能である材料を用いて形成され且つめっき用開口が設けられた表面被覆材と、この表面被覆材及びウェーハの裏面に液密的に密着可能な裏面被覆材とからなり、上記のようにして用いられる。

【0013】このシール体については、上記のような理由から、表面及び裏面の各被覆材をプラスチック材で形成するのが好ましく、また表面被覆材及び裏面被覆材をそれぞれの密着側面に熱溶着性のプラスチック材を施した多層構造で形成し、表面被覆材のウェーハの表面への密着及び両被覆材同士の密着を熱溶着でなすようにするのが好ましく、さらに表面被覆材のめっき用開口に沿って薄い導電体を配し、この導電体を表面被覆材のウェーハ表面への密着時にウェーハに接触させることでカソード電極を形成するようにするとさらに好ましい。

【0014】

【実施例】以下、本発明の一実施例について説明する。先ず本実施例で用いているシール体について説明する。図3に示すように、シール体1は、熱溶着性の高いプラスチックフィルムと耐めっき液性の高いプラスチックフィルムを積層させた2層構造で全体の厚みが50μm程度のプラスチック材を細長い長方形に整えたものを熱溶着性の高い側が内側になるように中間で折り曲げて形成されている。そしてその一方の側が表面被覆材2とされ、他方の側が裏面被覆材3とされている。この表面及び裏面の各被覆材2、3には、それぞれの隅部に支持受け部用の切欠き4a〜4dが形成されている。

【0015】また表面被覆材2には、ウェーハの外周形状に相似な内周形状を持つめっき用開口5が形成されている。このめっき用開口5は図1及び図2に見られるようにしてウェーハUを保持させた状態でウェーハUの外周縁部に3mm程度の幅で表面被覆材2が被さるサイズとされている。さらに表面被覆材2には、そのめっき用開口5に沿ってカソード電極用の導電体6が設けられている。この導電体6は、数十μm程度の厚みの銅板で形成され、全体的にウェーハUの外周形状に相似なリングで、その内側に一定の間隔で複数の接触子7、7、……を突設した構造とされ、予め表面被覆材2に接着されている。

【0016】このシール体1を図1及び図2に見られるような状態でウェーハUに取り付けるには、表面被覆材2と裏面被覆材3の間にウェーハUを挟み、それから加熱ローラの間を通過させるか、あるいはホットプレスを掛けるなどして加熱と加圧を行なう。そしてこの加熱と加圧により、表面被覆材2がめっき用開口5の周囲につ

いてウェーハUの表面に熱溶着し、またウェーハUの周囲の余白部分については全体的に表面被覆材2と裏面被覆材3とを互いに熱溶着する。この結果、めっき液に対し液密的にウェーハUの裏面を保護した図の状態での取付けがなされる。またこの状態で、導電体6の接触子7、7、……がウェーハUの周縁部に接触してカソードコンタクトが得られ、対となる切欠き4a~4dは、合わさって支持受け部8a~8dを形成する。

【0017】次に本実施例で用いるめっき装置について説明する。図4及び図5に示すように、めっき装置10は、めっき槽11の周囲を外周槽12で囲み両槽の間に貯留させた熱源液13でめっき槽内のめっき液14の温度制御を行なうようにした構造となっており、そのめっき槽11の中には複数個のシール体を同時に支持させるための支持体15が設けられ、まためっき槽11の底部には散気管16が設けられている。

【0018】その支持体15は、互いに平行にして設けた4本の支持バー17、17、……を有しており、この各支持バー17に対応の各支持受け部8a～8dを嵌め合わせ、各支持受け部8a～8dごとに両側から一对の固定環18、18で挟持・固定することでシール体1を支持するようになっている。また支持体15は、回転駆動機構19に接続されており、一定の時間単位で左右に交互に回転動を行なえるようにされている。

【0019】以上のようなシール体1に保持させたウェーハ10に上記のめっき装置10を用いてめっきを施すには、それぞれウェーハを保持する所定個数のシール体1を上記のようにして支持体15に支持させると共に、シール体1の間にアノード電極板Aも支持させ、この支持体15を上記のように一定の時間単位で左右に交互に回転動させながら所定時間めっきを行なう。この間、散気管16から適当量の気体を供給することで、シール体1に平行に沿って適当な流速の液流を形成させる。

【0020】所定時間のめっきが済んだらシール体1をめっき槽1から取り出し、所定の洗浄工程を経た後に、カッターナイフなどを用いてシール体1を切り裂いてウェーハを取り出す。

【0021】

【発明の効果】以上説明したごとく本発明によると、ウェーハに対するシール構造の厚みを格段に薄くすることができるので、小さなめっき槽で多くのウェーハを処理することが可能となり、装置が比較的小型で済むという“浸漬式”の長所をより一層伸ばすことができる。またシールした際のウェーハ表面への突出要素をなくすることができるので、高い電流密度で処理するためにめっき液に液流を与える場合でも均一性の高いめっきを施すことができ、めっき液に液流を与える場合にめっきの不均一性を招き易いという“浸漬式”の短所を改善することができる。

【図面の簡単な説明】

【図1】本発明で用いるシール体の斜視図。

【図2】図1のシール体をウェーハに取り付けた状態の斜視図。

【図3】図2中のSA-SA線に沿う断面図。

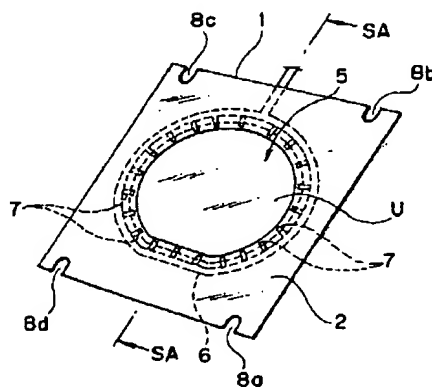
【図4】本発明で用いるめっき装置の簡略化した断面図。

【図5】図4のめっき装置におけるめっき槽の簡略化した断面図。

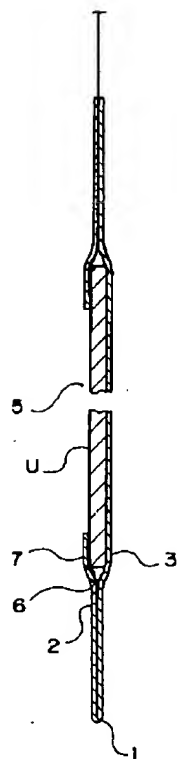
【符号の説明】

- 1 シール体  
2 表面被覆材  
3 裏面被覆材  
5 めっき用開口  
6 導電体  
U ウェーハ

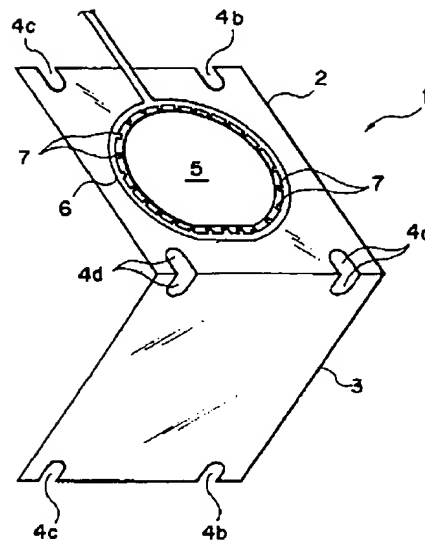
【图 1】



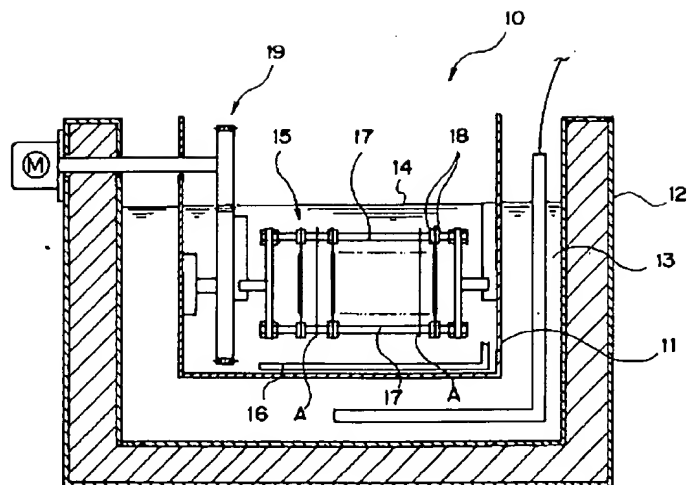
【図2】



【図3】



【図4】



(6)

特開平8-311689

【図5】

